

Investigating the influences of rapid climate change on the Moroccan Atlantic slope during Marine Isotope Stage 3

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The main geodynamic setting of the Moroccan margin (southern Gulf of Cadiz) is caused by the oblique convergence of the African and European plate resulting in a compressive regime. An accretionary wedge was formed by the westward motion of the Gibraltar Arc front during the Middle Miocene (Foubert *et al.*, 2008). As a consequence of increased subsidence, large olistostrome complexes, forming allochthonous nappes, were emplaced during the Tortonian. Above the olistostrome unit a 0.2 to 2km thick Neogene sedimentary cover was established. This cover is pierced by mud volcanoes, salt diapirs and fluid escape features showing evidence of strike-slip and compressional deformation (Medialdea *et al.*, 2004). This also has led to the formation of slope-traversing ridges such as the Renard ridge with the steep Pen Duick Escarpment in the El Arraiche mud volcano province. On top of this escarpment, dormant cold-water coral mounds were discovered (Van Rooij *et al.*, 2011)

The hydrodynamic context of the Gulf of Cadiz is complex. There is an interaction between the Mediterranean Outflow Water (through meddies), the Antarctic Intermediate Water and the North Atlantic Central Water (Richardson *et al.*, 2000). Even a multitude of smaller water masses and currents are affecting the area. Sea surface temperature, turbidity and the hydrodynamic setting changed in the northern part of the Gulf of Cadiz during the last 50ka. These changes are attributed to Heinrich events (HE) and Dansgaard/Oeschger (DO) oscillations (Cacho *et al.*, 2001). Palaeoceanographic studies, however, in the southern part of the Gulf of Cadiz are rare, creating a knowledge gap for the spatial and temporal evolution of oceanographic drivers for cold-water coral ecosystems.

Marine sediment core MD08-3227 (33m) taken off-shore Morocco in the Gulf of Cadiz into a Plio-Pleistocene sediment drift will be analysed on sedimentary composition and grain size distribution for a paleoceanographic study. Previous XRF Ca scanning results indicated a long time frame up to 300ka. It is assumed that the terrigenous input increase during dry periods, while it decreases during humid periods. This variation should be represented in the grain size distribution and would as a consequence be a good indicator for the palaeoclimatic changes. Sampling of the core will be performed at regular intervals covering the Marine Isotope Stage 3 (last full glacial period) and will shed more light on the impact of HE and DO events on bottom current circulation. The collected sediment samples will be sieved in wet conditions with distilled water separating the different fractions. Sortable silt fraction will be analysed with the Sedigraph providing a high resolution grain size distribution (mean grain size, sorting, kurtosis and skewness).

References

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